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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants: Banavar et al.

Group Art Unit: 2664

Serial No.: 09/281,421

Examiner: Ho, Chuong T.

Filed: 03/30/99

Appeal No.:

Title: MESSAGE LOGGING FOR RELIABLE MULTICASTING ACROSS A ROUTING NETWORK

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Brief of Appellants

Dear Sir:

This is an appeal from a final rejection, dated February 11, 2004, rejecting claims 1-15, 24-38, and 47-54, all the claims being considered in the above-identified application. This Brief is accompanied by a transmittal letter authorizing the charging of appellants' deposit account for payment of the requisite fee set forth in 37 C.F.R. §1.17(c).

YO998-525

Real Party In Interest

This application is assigned to **International Business Machines Corporation** by virtue of an assignment executed on March 24, 1999 and March 25, 1999 by the co-inventors, and recorded with the United States Patent and Trademark Office at reel 009879, frame 0268, on March 30, 1999. Therefore, the real party in interest is **International Business Machines Corporation.**

Related Appeals and Interferences

To the knowledge of the appellants, appellants' undersigned legal representative, and the assignee, there are no other appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the instant appeal.

Status of Claims

This patent application was filed on March 30, 1999, with the U.S. Patent and Trademark Office. As originally filed, the application contained fifty (50) claims, of which eight (8) were independent claims (i.e., claims 1, 16, 24, 39, 47, 48, 49 & 50).

In an initial Office Action dated August 14, 2002, claims 1-2, 24-26 & 29 were rejected under 35 U.S.C. §103(a) as being obvious over Chandra et al. (U.S. Patent No. 6,091,724; hereinafter Chandra) in view of Rochberger et al. (U.S. Patent No. 6,272,107; hereinafter Rochberger); claims 3-15 and 27-38 were rejected under 35 U.S.C. §103(a) as being obvious over the combined system of Chandra-Rochberger in view of Wakeland (U.S. Patent No. 6,101,192; hereinafter Wakeland); and claims 16-23, 39-46, 47, 48 & 50 were rejected under 35 U.S.C. §103(a) as being obvious over Wakeland in view of Rochberger. In appellants' response mailed November 14, 2002, claims 1, 14, 16, 23, 24, 38, 39 & 46-50 were amended.

In a final Office Action dated January 30, 2003, claims 1-15, 24-38, 47 and 49 were rejected as being obvious over Chandra in view of Doshi et al. (U.S. Patent No. 5,222,061; hereinafter Doshi) and claims 16-23, 39-46, 48 and 50 were rejected as being obvious over Doshi in view of Drottar (U.S. Patent No. 6,343,067 B1; hereinafter Drottar). In appellants' response mailed March 28, 2003, claims 16-23 & 39-46 were cancelled without prejudice; claims 1, 4, 5, 10, 11, 13-15, 24, 28, 29, 32-35, 37, 38 & 47-50 were amended; and new dependent claims 51-54 were added.

In an Advisory Action dated April 22, 2003, appellants' response was considered, however appellants' amendments were not entered on grounds that the amendments raised new issues requiring a new search. In response, appellants filed a Request for Continued Examination on April 29, 2003, which requested consideration of the amendments submitted March 28, 2003.

In an Office Action dated August 12, 2003, claims 1-15, 24-38, 47-54 were rejected as being obvious over Chandra in view of Marco et al. (U.S. Patent No. 6,266,337 B1; hereinafter Marco); and claims 1-15, 24-38 and 47-54 were rejected as being obvious over Bracho (U.S. Patent No. 6,021,443; hereinafter Bracho) in view of Marco. In appellants' response mailed November 12, 2003, claims 1, 24, 47, 48 & 50 were amended.

In a final Office Action dated February 11, 2004, claims 1-15, 24-38, & 47-54 were rejected as being obvious over Chandra in view of Marco; and claims 1-15, 24-38 & 47-54 were rejected as obvious over Bracho in view of Marco. In appellants' response mailed March 22, 2004, no claims were amended.

In an Advisory Action dated April 14, 2004, appellants' response was considered, however, the grounds of rejection were maintained. A Notice of Appeal to the Board of

Patent Appeals and Interferences was filed on May 10, 2004. The status of the pending claims is therefore as follows:

Allowed claims - none
Claims objected to - none
Claims rejected - 1-15, 24-38, & 47-54.
Claims canceled - 16-23 & 39-46.

Appellants are appealing the rejection of claims 1-15, 24-38, and 47-54.

Status of Amendments

Appellants proffered no amendments responsive to the final Office Action dated February 11, 2004. The claims as set out in the Appendix include all prior entered claim amendments.

Summary of the Invention

Appellants' invention is directed to a technique for routing messages within a network environment (100). The technique includes, in part, receiving a message into the network and routing the message to multiple clients (101) of the network. The routing is accomplished based on data content of the message irrespective of any destination information within the message. Further, the routing is resilient to router (108) or link (link 1, link 2, link 3 in FIG. 2) failure within the network and is accomplished without loss of the message. (See Specification pages 9-16).

In one particular aspect, the network is a publish/subscribe system (300) supporting content-based subscription, wherein the one or more clients comprise subscribers (306), and the routing comprises delivering the message to all subscribers requesting a uniform delivery quality of service or if unable to deliver the message to all the subscribers requesting uniform delivery, delivering the message to none of the subscribers requesting uniform delivery. (See specification, pages 15-19).

In a further aspect, the technique includes logging the message at at least one logging node (FIG. 5) within the network before delivering the message to the multiple clients of the network. The logging includes storing the message in persistent storage 460. (See specification pages 16-21). The logging is employed to ensure resiliency in routing the message to multiple clients despite router failure *per se*, and/or despite multiple router or link failures within the network, and is accomplished without loss of the message (see claims 51-54; and specification pages 4-5 & 15-18).

Issues

1. Whether claims 1-15, 24-38, & 47-54 were rendered obvious under 35 U.S.C. §103(a) to one of ordinary skill in the art by Chandra in view of Marco.

2. Whether claims 1-15, 24-38, & 47-54 were rendered obvious under 35 U.S.C. §103(a) to one of ordinary skill in the art by Bracho in view of Marco.

Grouping of Claims

Since each ground of rejection provides a grouping of claims, the following group of claims is included herein:

I. Claims 1-15, 24-38, & 47-54.

Appellants respectfully submit that the claims of Group I do not stand or fall together. For example, dependent claims 2 & 26, 4 & 28, 51 & 53, and 52 & 54 each include additional features that provide separate base of patentability over the applied art.

Argument

Group I: Claims 1-15, 24-38, & 47-54

As noted, claims 1-15, 24-38, & 47-54 stand rejected as obvious over Chandra in view of Marco and as obvious over Bracho in view of Marco. Reversal of these rejections is respectfully traversed.

Appellants respectfully request reversal on the following grounds: (1) the final Office Action has misinterpreted the teachings of the Marco patent, thus voiding the underlying basis for the rejections; (2) the justifications for combining the documents are deficient; (3) the documents themselves lack any teaching, suggestion, or incentive for their combination; and (4) the combination is a hindsight reconstruction of the claimed invention using appellants own disclosed subject matter.

In contrast to appellants' claimed invention, Chandra describes routing of a message within a network using data content of the message to determine on which links out of a router the message is to be forwarded. The router does not need any destination information from the message, and thus, the message need not include the destination information. Instead, the router uses an annotated search data structure to determine which links correspond to consumers interested in receiving the message. The message is sent over only those links.

Bracho describes systems and methods for routing events amongst publishers and subscribers of a computer network. A plurality of "publisher" entities publish information and a plurality of "subscriber" entities request and use the information. The publishers and subscribers are connected to each other through a network. The network is a "store and forward network" whose routing is "content based." The system receives a published event from a publisher and routes the event to all appropriate subscribers.

Without acquiescing to the characterizations of Chandra and Bracho in the final Office Action, appellants note that the final Office Action admits that Bracho and Chandra are both silent as to disclosing routing of messages to multiple clients of a network, wherein the routing is resilient to router or link failure within the network without loss of the message. For an alleged teaching of this concept, the final Office Action relies upon Marco, and in particular, column 2, lines 3-7 and column 3, lines 15-25, as well as lines 47-60. Based upon these teachings of Marco, the final Office Action rejects all pending claims. Appellants traverse the final Office Action's characterizations of the teachings of the Marco patent, and in particular, of the above-cited lines of Marco. For convenience, the cited lines of Marco are repeated below:

> When a retransmission message is received at the other end of the path, the actual packet (which was stored in a data memory during the prior transmission) is retrieved from the data memory and routed to the final destination in the usual manner. (Column 2, lines 3-7 of Marco).

> In accordance with one embodiment of the invention, retransmission eliminators 36A and 36B reduce the traffic associated with the retransmission of packets over the hop. The first time a packet is sent over the hop, the packet is stored in a cache 38 and 40 at each end of the hop. When the router 30 sends a packet over the hop, the retransmission eliminator 36A on that end of the hop compares the packet with the packets stored in the cache 38. When there is a match (i.e., when the packet is a retransmitted packet), the retransmission eliminator 36A sends a special retransmission packet 42 over the hop instead of the actual packet. The retransmission packet 42 includes information that uniquely identifies the packet. (Column 3, lines 15-25 of Marco).

> Given the above scenario, it is more likely that packets will be "lost" on the local network than the IP hop. When a packet is "lost" the packet source (e.g., host computer 24) attempts to retransmit the packet over the expensive long distance link (i.e., the hop). The retransmission eliminator 36A, however, intercepts the packet and instead only sends a relatively small transmission packet 42 over the expensive link. The retransmission eliminator 36B on the local network side of the hop then retrieves and sends the actual packet to the destination computer 20. Thus, the retransmission eliminators 36A and 36B reduce the traffic on the relatively expensive link (i.e., the hop) thereby reducing transmission costs. (Column 3, lines 47-60 of Marco).

As noted from the above citations, Marco describes a packet retransmission eliminator which is installed on opposite ends of a hop within a path in a network. Each original packet sent over the path is cached on the transmitting and the receiving ends of the path. Retransmitted packets that are to be sent over the path are intercepted and replaced with a substitute transmission packet (which is presumably much shorter in length). **In response to a received retransmission packet request,** the receiving end retransmits the original packet using the corresponding packet that was previously stored in the cache. As clearly stated in the patent, Marco is directed to enhancing performance by reducing overhead associated with packet retransmission in a packet-based network (see column 1, lines 4-7), and Marco assumes the existence of a retransmission packet request.

Appellants' independent claims recite routing a message to multiple clients of a network, based on data content or the message, irrespective of any destination information within the message, in a manner that is resilient to router or link failure within the network without loss of the message. There is no discussion in Marco of router or link failure per se, nor of a resilient routing technique for a network which routes a message without loss of the message, notwithstanding router or link failure. When a packet is lost, the packet source attempts to retransmit the packet over the expensive long distance link (i.e., the hop). The purpose of the Marco patent, therefore, is to eliminate or reduce the need for this retransmission by only sending a relatively small retransmission packet over the expensive link (see column 3, lines 47-60 of Marco).

To the extent that Marco discusses "loss" of a packet, the patent assumes that a packet is lost on a local network connected to one end of the IP hop. As described at the above-repeated column 3, lines 48-54, Marco indicates that lost packets in a network need to be retransmitted "due to loss of packets on a local network". This loss of packets could be the result of corruption of a message, or a higher-level protocol which requests

retransmission of a message periodically. There is simply no implication in Marco as to why retransmission occurs, nor is it necessarily inherent in Marco that retransmission was the result of a router or link failure. In view of this, appellants respectfully, but most strenuously, traverse the characterization of the above-cited lines of Marco as being relevant to appellants routing technique, which is resilient to router or link failure.

Marco depicts in FIG. 1 routers 30, 32 and various connecting links. A careful reading of Marco fails to uncover any discussion of a routing technique which is resilient one of these routers or links failing during the routing process. Marco does not teach how to route a message per se, nor does Marco teach how or when a sender should retransmit a message, nor how or when a receiver should detect a lost message or should request retransmission of a message. Marco merely acknowledges that in various protocols (e.g., point-to-point TCP), retransmission of messages will occur. Marco only addresses how to detect when retransmission occurs, and specifically when the contents of the retransmitted message happen to be in cache, how to accomplish the retransmission with less bandwidth cost than would otherwise occur without the cache. Marco does not teach causing retransmission to occur, but only responds to a retransmission request initiated by some other protocol. In view of this, Marco does not add any element of resiliency not already provided by the external protocol used to initiate a retransmission request. Marco only addresses reducing the cost of retransmission in a system where there has been a request for retransmission. Marco does not discuss or address failure of a link or router in an environment wherein a message is being routed to multiple clients of a network as recited by appellants.

Further, appellants respectfully submit that there is no teaching or suggestion in Marco of a routing technique which is resilient to router or link failure within a network without loss of the message. Marco explicitly teaches that the functional element of his retransmission eliminator includes a "cache" (see FIG. 1, reference 38 & 40, as well as column 2, line 22, column 3, line 18, etc. of Marco). In the art, the term "cache" is well

understood and widely used to refer to a "soft copy" of a state. That is, a cache is a copy of data other than a "master copy" of the state, that may or may not be present, but when present may speed up performance of some function.

With respect to the implementation in Marco, it is apparent that Marco is using the term "cache" as the term would imply, that is, that data does not persist and that messages can be flushed out either due to space limitations or due to time expiration (see column 5, lines 9-21 of Marco). Therefore, there is no guarantee in Marco that a particular message will be retained for a period of time within the cache to guarantee message delivery notwithstanding router or link failure.

Because the mechanism described by Marco is incapable of providing appellants' recited routing resiliency (without loss of a message and notwithstanding router or link failure), appellants respectfully submit that the final Office Action misinterprets Marco and that this misinterpretation undercuts its viability as a reference when combined with either Chandra or Bracho, rendering the rejections improper on this basis alone.

Further, appellants strenuously traverse the combinability of Marco with either Chandra or Bracho. The only justification given for the combination is the following language at pages 5 & 8 of the final Office Action:

> Given the teaching of Marco, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Chandra's system to being resilient to router or link failure within network in order to guarantee the message to be received by all subscriber.
>
> Given the teaching of Marco, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Bracho to being resilient to router or link failure within the network in order to guarantee the message to be received by all subscriber.

Noticeably absent from these justifications is any express teaching, suggestion or incentive identified in the art for making the proposed combination. Just as in Winner International Royalty Corp. v. Wang, 48 U.S.P.Q. 2d 1139, 1144 (D.C. 1998), wherein the court overturned a Board finding of obviousness, hindsight is always perfect and it is insufficient to prove at the time of the claimed invention, the separate elements of the device were present in the known art. "Rather, there must have been some explicit teaching or suggestion in the art to motivate one of even ordinary skill in the art to combine such elements so as to create the same invention." Id. Winner's cited authority, Arkie Loures Inc. v. Gene Larew Tackle Inc., 43 U.S.P.Q. 2d 1294, 1297 (Fed. Cir. 1997), similarly holds that:

> It is insufficient to establish obviousness that the separate elements of the invention existed in the prior art, absent some teaching or suggestion, in the prior art to combine the elements.

The above-repeated justifications do not identify a teaching, suggestion or incentive in the art to combine the references as required by cases like Winner and Arkie. The justifications are simply a restatement of the alleged results of the combination, rather than a reason for the combination drawn from the prior art or from the knowledge available to one of ordinary skill in the art.

Still further, upon a review of the applied patents, there is no teaching, suggestion or incentive for the combination. Marco teaches optimizing retransmission of a packet within a point-to-point network. In contrast, Chandra and Bracho each teach routing of messages to multiple clients in a network (i.e., one to many routing). One of ordinary skill in the art could not combine the point-to-point teachings of Marco with either Chandra or Bracho given the unique issues and problems associated with a one-to-many routing of a message such as disclosed therein. Even if resiliency were inherent in Marco, the point-to-point resiliency discussed therein does not apply to an environment where a message is being routed to many clients (as recited by appellants). One skilled in the art of communications protocol would not know how to do a reliable one to many routing of a message given the teachings of Marco.

Yet further, the justifications provided in the final Office Action for the combination offer no technical basis outside that contained in appellants' own specification, they merely restate the results of the combination in hindsight, the rejections also violate the well known principle that appellants own disclosure cannot be used as a reference against them.

The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that the claimed invention should be carried out and would have a reasonable likelihood of success, viewed in light of the prior art. Both the suggestion and the expectation of success must be found in the prior art, not in the appellants' disclosure. In re Dow Chemical Company, 5 U.S.P.Q. 2d 1529, 1531 (Fed. Cir. 1998) (multiple citations omitted). The combination simply restates the alleged results of the combination, and is therefore using appellants' disclosure, rather than an identified basis in the prior art, to combine the documents, in violation of this well-known principle. This is yet another, independent reason why the current invention is not obvious.

In summary, appellants traverse the rejections of the independent claims based on the misinterpretation of the Marco patent; the conclusory nature of the reason for the combination; the lack of an actual teaching, suggestion or incentive in the art for the combination; and the use of appellants' own disclosure and results as a basis for the combination.

There is no discussion in Marco of router or link failure, nor is there any discussion of how or when to redeliver a message due to a router or link failure. Still further, there is no discussion in Marco of how to deliver a message to multiple clients of a network without loss of the message notwithstanding router or link failure within the network. There is simply no teaching of how not to lose messages within a network notwithstanding failure of a router or a link. Marco does not teach any algorithm,

protocol, or other mechanism to recover from a router or link failure. Marco does not disclose how to detect when to retransmit messages, nor does he teach any mechanism by which the content of such messages could be retrieved. Still further, the stated purpose of Marco is to provide a more efficient retransmission mechanism. Nothing in Marco discusses routing resiliency without loss of a message notwithstanding failure of a link or router in the network. For all these reasons, appellants respectfully request reversal of the obviousness rejection to the pending claims based upon the combination of Chandra and Marco, as well as Bracho and Marco.

The dependent claims are believed allowable for the same reasons as the independent claims, as well as for their own additional characterizations. For example, neither Bracho, Marco or Chandra teach, suggest or imply all or nothing routing to multiple clients such as recited by appellants in claims 2 & 26. Further, appellants recite logging a message to at least one logging node within a network before delivering the message to multiple clients in the network. This logging includes storing the message to persistent storage (claims 4 & 28). Neither Bracho, Marco or Chandra teach or suggest storing a message to persistent storage prior to delivery thereof. Note again that the cache described by Marco is volatile memory and does not qualify as persistent storage as the term is understood in the art. Claims 51 & 53 further characterize the routing of the message being specifically resilient to router failure within a network without loss of the message. There is no suggestion or implication that the message caching in Marco would survive a router failure. Claims 52 & 54 further recite that the routing of the message to the multiple clients is resilient to multiple concurrent router or link failures within the network without loss of the message. A careful reading of Marco fails to uncover any suggestion or implication that the point-to-point retransmission technique therein could withstand multiple router or link failures.

For all of the above reasons, appellants respectfully submit that the claims of Group I are patentable over the applied art. In view of this, appellants request reversal of the obviousness rejection to the claims of Group I.

Conclusion

Appellants herein request reversal of the 35 U.S.C. §103 rejections of claims 1-15, 24-38, & 47-54 set forth in the final Office Action. The art does not, individually or in combination, teach or imply appellants' recited invention, which includes, in part, a message content based routing technique which is resilient to router or link failure within a network without loss of the message.

For the above reasons, appellants allege error in rejecting the recited invention as obvious based on the applied art. Accordingly, reversal of all rejections is respectfully requested.

Respectfully submitted,

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Dated: June 21, 2004

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Appendix

1. A method for routing messages within a network, said method comprising:

receiving a message; and

routing said message to multiple clients of said network, said routing being based on data content of said message irrespective of any destination information within said message, and being resilient to router or link failure within said network without loss of said message.

2. The method of claim 1, wherein said network comprises a publish/subscribe system supporting content-based subscription, said one or more clients comprise subscribers, and wherein said routing comprises delivering said message to all subscribers requesting a uniform delivery quality of service or if unable to deliver said message to all of said subscribers requesting uniform delivery, delivering said message to none of said subscribers requesting uniform delivery.

3. The method of claim 2, wherein said delivering said message to all subscribers requesting uniform delivery comprises delivering said message to all subscribers requesting uniform delivery notwithstanding failure at one or more routers or links of said network, said delivering comprising storing said message to persistent storage at a logging node of said network prior to providing said message to said subscribers requesting uniform delivery.

4. The method of claim 1, wherein said routing comprises logging said message at at least one logging node within said network before delivering said message to said multiple clients of said network, said logging comprising storing said message in persistent storage.

5. The method of claim 4, further comprising subsequent to said logging of said message, sending a logging acknowledgment to at least one router of said network routing said message, and upon receipt of said logging acknowledgment at said at least

one router, delivering said message to a client thereof, said client requiring uniform delivery and comprising one client of said multiple clients.

6. The method of claim 5, further comprising buffering said message at said at least one router of said network routing said message, said buffering occurring prior to said storing of said message at said persistent storage and when passing said message through said at least one router to said at least one logging node.

7. The method of claim 5, wherein said network comprises a plurality of routers coupled together, one of said routers comprising said logging node having said persistent storage associated therewith, said logging comprising employing said logging node having said persistent storage associated therewith to store said message and to thereafter send said logging acknowledgment back to each router of said network responsible for routing said message.

8. The method of claim 1, wherein said network comprises a spanning tree and wherein said method further comprises providing a logging node within said spanning tree for logging said message to persistent storage during routing of said message to said one or more clients of said network.

9. The method of claim 8, wherein said routing comprises employing said logging of said message to persistent storage to ensure a uniform delivery quality of service of said message to said one or more clients of said network notwithstanding failure of one or more routers or links within said network.

10. The method of claim 1, wherein said network comprises a spanning tree having a plurality of routers, said method further comprising detecting failure of a router within said tree before completing routing of said message to said multiple clients of said network, reconfiguring said tree to replace said failed router with a new router, and automatically generating a request for retransmission of said message.

11. The method of claim 10, further comprising prior to said detecting of said failure, logging said message within persistent storage of said network and issuing a logging acknowledgment confirming storage of said message to at least one router of said tree through which said message is routed to said multiple clients.

12. The method of claim 10, wherein said automatically generating said request for retransmission of said message occurs if said new router detects from one or more of its child routers a logging number associated with said message, said logging number having been received in said logging acknowledgment confirming storage of said message.

13. The method of claim 1, wherein said routing further comprises determining within said network whether said message comprises a duplicate message to said multiple clients of said network, and if so, aborting said duplicate message such that said message is delivered to said multiple clients at most once.

14. The method of claim 1, further comprising automatically informing a sender of said message when the message has not been received by the network to allow the sender to retransmit said message to the network for routing to said multiple clients of said network so that said message is delivered at least once to said multiple clients.

15. The method of claim 1, wherein said routing comprises logging said message at at least one logging node within said network before delivering said message to said multiple clients of said network, said logging comprising storing said message into persistent storage, and wherein said method further comprises subsequent to said logging of said message, sending a logging acknowledgment to at least one router of said network routing said message, and upon receipt of said logging acknowledgment at said at least one router of said network routing said message, looking up routing information for said message from a message table maintained at said at least one router, then sending said logging acknowledgment across said network using said looked up routing information, and thereafter deleting said routing information from said message table.

16-23. (Previously Cancelled).

24. A system of routing messages within a network, said system comprising:

means for receiving a message; and

means for routing said message to multiple clients of said network, said routing being based on data content of said message irrespective of any destination information within said message, and wherein said means for routing is resilient to router or link failure within said network without loss of said message.

25. The system of claim 24, wherein said network comprises a publish/subscribe system supporting content-based subscription, and wherein said one or more clients comprise subscribers, with said message being received from a publisher.

26. The system of claim 25, wherein said means for routing comprises means for delivering said message to all subscribers requesting a uniform delivery quality of service or if unable to deliver said message to all of said subscribers requesting uniform delivery, for delivering said message to none of said subscribers requesting uniform delivery.

27. The system of claim 26, wherein said means for routing delivers said message to said subscribers requesting uniform deliver notwithstanding failure at one or more routers or links of said network, and wherein said system further comprises means for logging said message to persistent storage prior to delivery thereof to said subscribers requesting uniform delivery.

28. The system of claim 24, wherein said means for routing comprises means for logging said message to at least one logging node within said network before delivering said message to said multiple clients of said network, said means for logging comprising means for storing said message in persistent storage.

29. The system of claim 28, further comprising means for sending a logging acknowledgment to at least one router of said network routing said message after said means for logging stores said message in persistent storage, and wherein said system further comprises, at said at least one router of said network routing said message, means for delivering said message to a client thereof upon receipt of said logging acknowledgment, said client requiring uniform delivery and comprising one client of said multiple clients.

30. The system of claim 29, further comprising means for buffering said message at said at least one router of said network routing said message, said buffering occurring prior to said storing of said message at said persistent storage by said means for logging.

31. The system of claim 29, wherein said network comprises a plurality of routers coupled together, one of said routers comprising said logging node having said persistent storage associated therewith, and wherein said means for logging comprises means for employing said logging node having said persistent storage associated therewith to store said message and to thereafter send said logging acknowledgment back to each router of said network responsible for routing said message.

32. The system of claim 24, wherein said network comprises a spanning tree and wherein said system further comprises a logger node within said spanning tree for logging said message to persistent storage during routing of said message to said multiple clients of said network.

33. The system of claim 24, wherein said means for routing comprises means for employing said logger node to log said message to persistent storage to ensure a uniform delivery quality of service of said message to said multiple clients of said network notwithstanding failure of one or more routers or links within said network.

34. The system of claim 24, wherein said network comprises a spanning tree having a plurality of routers, and further comprising means for detecting failure of a

router within said tree before completing routing of said message to said multiple clients of said network, and means for reconfiguring said tree to replace said failed router with a new router, and means for automatically generating a request for retransmission of said message.

35. The system of claim 34, further comprising means for logging said message within persistent storage of said network and for issuing a logging acknowledgment confirming storage of said message to at least one router of said tree through which said message is routed to said multiple clients.

36. The system of claim 35, wherein said means for automatically generating a request for retransmission of said message comprises means for detecting a logging number associated with said message stored at one or more child routers of said new router.

37. The system of claim 24, wherein said means for routing further comprises means for determining within said network whether said message comprises a duplicate message to said multiple clients of said network, and if so, for aborting said duplicate message such that said message is delivered to said multiple clients at most once.

38. The system of claim 24, further comprising means for automatically informing a sender of said message when said message has not been received by the network to allow the sender to retransmit said message to the network for routing to said multiple clients of said network so that said message is delivered at least once to said multiple clients.

39-46. (Previously Cancelled).

47. A system for routing messages comprising:

a network adapted to receive and log a message to persistent storage; and

said network comprising one or more routers adapted to route said message to multiple clients of said network, wherein said routing of said message by said one or more routers is based on data content of said message irrespective of any destination information within the message, and is resilient to router or link failure within the network without loss of said message.

48. A system for routing messages comprising:

a network adapted to receive a message;

a logger node within said network for logging said message to persistent storage; and

said network comprising one or more routers for delivering said message to multiple clients of said network, wherein said routing of said message by said one or more routers is based on data content of said message irrespective of any destination information within the message, and wherein said logging of said message to persistent storage occurs prior to delivery of said message to said multiple clients of said network, thereby providing resiliency of said routing without loss of said message notwithstanding router or link failure within said network.

49. An article of manufacture, comprising:

at least one computer usable medium having computer readable program code means embodied therein for effecting routing of messages within a network, the computer readable program code means in the article of manufacture comprising:

computer readable program code means for causing a computer to effect receiving a message; and

computer readable program code means for causing a computer to effect routing said message to multiple clients of said network, said routing being based on data content of said message and being resilient to router or link failure within said network without loss of said message.

50. An article of manufacture, comprising:

at least one computer usable medium having computer readable program code means embodied therein for effecting routing of messages within a routing network, the computer readable program code means in the article of manufacture comprising:

computer readable program code means for causing a computer to effect receiving a message;

computer readable program code means for causing a computer to effect logging said message to persistent storage within the routing network; and

computer readable program code means for causing a computer to effect delivering said message to multiple clients of said network after said logging thereof, wherein said routing is based on data content of said message irrespective of any destination information within said message, and wherein said logging to persistent storage prior to delivery of said message to said multiple clients of said network provides resiliency of said routing without loss of said message notwithstanding router or link failure within said network.

51. The method of claim 1, wherein said routing of said message to multiple clients of said network is resilient to router failure within said network without loss of said message.

52. The method of claim 1, wherein said routing of said message to multiple clients of said network is resilient to multiple concurrent router or link failures within said network without loss of said message.

53. The system of claim 24, wherein said means for routing is resilient to router failure within said network without loss of said message.

54. The system of claim 24, wherein said means for routing is resilient to multiple concurrent router or link failures within said network without loss of said message.

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